IMPACT EVALUATION REPORT

ON

DESERT FARMING SYSTEMS (EGYPT) III

" INTEGRATED FARMING SYSTEMS FOR PRODUCTIVE USE OF ARID LAND.

PHASE THREE : ON- FARM AND BACK UP RESEARCH AND DEMONSTRATION."

(IDRC PROJECT: 3-P- 85-0193)

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I. PROJECT PROFILE

Project Title	: Desert Farming systems (Egypt) Phase III. " Integrated Farming Systems for Productive Use of Arid Land. Phase Three: On Farm And Back Up Research and Demonstration"
Project IDRC File	: 3-p-85-0193
Donor	: IDRC
Funding Unit	: AFNS- Crop and Animal Production Systems- Farming Systems.
Amount of Grant	: 373,800 CAD
Fiscal Year	: 1985 / 1986
Date Funds Committed	: 5 / 21 / 1986
Duration	: 1986 - 1989
Co-funding agencies	: Ford Foundation Near East Foundation
Recipient	: Desert Development Centre American University in Cairo, Egypt
Project Leader	: Dr. Adli Bishay
Areas of project implementation	: Sadat City & South of Tahrir

II. BACKGROUND

1- The problem of land reclamation

More than 95 % of the Egyptian land is desert. The presently cultivated area of the country is a subject of pressing stresses because of the increasingly growing population, and the conflict over land use allocations. Since the mid fifties the Government of Egypt recognised the importance of increasing the cultivable land area on one hand, and the increase of productivity of the " old " land in the Nile Valley and Delta .

However, the expansion of cultivable land through the reclamation of desert areas continues to be a major objective in development plans of the country. Yet, desert reclamation is not an easy task, it is slow and costly. Production in the newly developed lands is often constrained by various factors, *e.g.* poor soil; scarcity of water quantity or poor water quality; lack of infrastructure; high cost of energy, manpower and transportation; the isolation of the newly reclaimed fields from marketplace; and above all, the limitedness of " desert experience " among both farmers; developers, and researchers. Needless to mention the almost absence of extension services.

2- The Desert Development Centre (DDC)

In 1979, the American University in Cairo (AUC) initiated a " Desert Development, Demonstration and Training Project" to search for technologies appropriate for desert agriculture where water and soil nutrients are scarce, and energy is expensive. In 1985, the project has developed to the Desert Development Centre (DDC). The DDC had three major components:

- renewable energy technology;
- community development; and
- agriculture

The latter component involved " an integrated approach aimed at the development of farming systems suitable for the desert environment to improve the productivity of its sandy soil " (the project proposal, p.1, see Annex 1).

In an interview with Dr. Adly Bishay, the PI, he stressed the concept of " dealing with the desert as a desert ". That means " the recognition of the fragility and resource scarcity of the desert ecosystem ". Now the DDC has two field stations in addition to its administration office in the AUC building in Zamalek, Cairo. There is one station in Sadat City and another one in South Tahrir, 100 km north west of Cairo, where most of the project research was carried out.

3- Desert Farming Systems Project (DFSP)

Against this background the DDC has received support from several donors, including IDRC, in an attempt to ensure a holistic approach to desert development. The IDRC - supported project, Desert Farming Systems (DFS) lasted almost for 10 years, from 1980 to 1990, through three successive phases.

The overall objective of DFSP since its inception in 1980 and throughout its three phases was " to improve the productivity of the virgin desert sandy soil, and develop suitable desert farming systems for management by smallholders and co-operatives".

Phase I, started in August 1980, focused on development of the infrastructure and the investigation of initial cropping pattern of the coarse sandy soil.

Phase II, begun in November 1983, focused greater research attention on the agronomic practices involved in developing alternative desert farming systems.

In Phase III, the IDRC support has focused on the on-farm testing of promising agricultural technologies, identified by the researchers at the South Tahrir site. Back-up research has continued to establish more suitable agronomic practices for the desert farming systems.

4- Objectives of Phase III

According to the project proposal (p.4), phase III had the following **general objectives**:
" To improve farming systems in newly-reclaimed desert lands".
There were also four **specific objectives**:

a- to conduct on-farm research and demonstration on the lands of " settlers " at S. Tahrir;

b- to evaluate the most promising cropping patterns of sandy desert soils;

c- to evaluate efficient systems if soil, water, and fertiliser management; and

d- to evaluate, technically and economically, conservation tillage.

In other words, the package of agricultural practices focused on by the project in phase III included: crop rotation, fertilisation, tillage and irrigation; in addition to the on-farm demonstration.

III. METHODOLOGY

1- Review of project documents handed to me by the IDRC (see Annex 1): project proposal, project completion report, project summary, project appraisal, summary of the previous two phases (I & II) , second progressive report, and third and final progressive report.

2- Review of some DDC publications and training books (see Annex 2).

3- Field visits to the two stations of DDC in Sadat City and South of Tahrir (see Annex 3).

4- Visits to some farms in which the on-farm demonstrations were carried out (in El Nagah Village, El Tahaddi Sector , S. Tahrir) (see Annex 3).

5- Interviews with the DDC Director, researchers in the DDC stations, and the training programme officers as well as agricultural engineers and technical personnel in the DDC (see Annex 4).

6- Interview with Dr. Adli Bishay, the PI of the project (Annex 4).

7- Interview with DDC farm manager, and farmers in S. Tahrir.

8- Meeting with Dr. Fawzy Kishk, IDRC director, Cairo.

IV. EVALUATION RESULTS

1- Inputs / Activities

1.1. Inputs

• According to the IDRC documents the DDC has received 2 previous phases of IDRC support since 1980. Phase I support (1979) amounted 358,000 CAD; and phase II support (1983) was 370,700 CAD. Phase III (1989) received from IDRC a fund of 373,800 CAD. Moreover, in 1994 the IDRC offered a grant of 200,000 CAD to a new DDC project on " Desert Irrigation Efficiencies (DIE) " which is scheduled to be concluded in October 1997. The total amount of IDRC financial supports to the three phases of DFSP reached a sum of 1,102,500 CAD. Adding

the 200,000 CAD support to the DIE project, the total financial support given by IDRC to the DDC since 1980 till now reached 1,302,500 CAD.

• The DFSP has received additional support from other two funding agencies, *i.e.* Ford Foundation, supported socio-economic research with the settled farmers of South Tahrir; and Near East Foundation supported research on horticulture crops. In addition, since 1984, the MAXI Linkages project (funded by USAID through the Egyptian Supreme Council of Universities) supported, the development of small model farms for the desert.

• The recipient (AUC) made in-kind contribution to the project, consisting of land, buildings, facilities, and equipment use.

• The DDC was able to recruit a multidisciplinary team of different agronomic specialities affiliated to various Egyptian universities and research centers. They worked at full-, or part-time bases.

• Seven participationg farmers in S. Tahrir offered their own fields for the on-farm demonstration component of the project.

1.2. Activities

The project was implemented through a variety of activities which included:

a- in-house research: experiments that were carried out in the DDC own farm in S. Tahrir Station;

b- on-farm demonstration program: field trials took place in seven farms , 20-30 feddans each, (one feddan = 4200 m^2) in El Tahaddi Sector, S. Tahrir;

c- laboratory work: for the analyses of soil samples, nutrients, trace elements... etc. in the DDC laboratories; in Sadat City Station;

d- surveys, through questionnairs, to identify the prevailing problems in farmers' lands in the S. Tahrir area;

e- interviews with participating farmers to gather information on farmers, attitudes *vis á vis* DDC program, certain agricultural practices and innovations suggested by DDC team, farmers' acceptance and / or adoption of new crops and varieties, and farmers feedbadk and suggestions to improve the program.

f- Participation in conferences, seminars and workshops, in which communications were presented by the project leader and members of the research team;

g- training courses organised for undergraduate students and University graduates who benefited from the government allocation of new reclaimed land program; and

h- technical bulletins were prepared and distributed to farmers.

2- Outputs

In view of the stated objectives of the project, there were four aspects on which phase three has concentrated, i.e. crop rotations suitable for desert conditions; suitable timing for crop seeding, rate, and type of fertilisation for different crops; tillage; and irrigation. According to project reports and other available documents, the project has achieved its pre-defined objectives, and the outputs were consistent with the activities carried out through the course of the project.

1- The project has tested five long-term crop rotations over 5-6 years. Three of them were found to be promising. A rotation of alfalfa for 3-4 years interrupted for one or two years by annual cereal crops was suitable for farming systems including animal production. Another promising rotation was that including the alternation of cereals / legumes / cash crop (e.g. groundnuts, peas or wheat).

Crop yield and benefit increase were the bases on which the tested rotations were ranked. However, these criteria have been faced by climatic fluctuations, weed outbreaks, water shortage, and unavailability of necessary inputs such as fertilisers and pesticides.

2- Fertilisation experiments highlighted the importance of phosphorous, nitrogen and potassium additions to the sandy soil in the area. Fertilisation rates and combinations were broadly calculated in regards to crops and rotations. These experiments have pointed to the essential importance of micro nutrients for fodder and field crops. A major weakness in this part was that it was designed on the fact that " fertilisers are heavily subsidised by the state, so fertilisers' costs do not constitute a significant component of the production costs" . After the state withdrawal from subsidising the agricultural inputs, the fertilisation package unfortunately had lost its applicability, and it should be reconsidered in view of the new economic conditions.

3- Although zero tillage can greatly reduce soil erosion in desert lands, experiments showed that it was not suitable in this area because of weed outbreaks and the subsequent decrease of crop yield. Instead, minimum tillage (one discing) was recommended. This practice is currently adopted in both the DDC farm and in farmers' fields.

4- Different irrigation schemes (including techniques and frequency) were examined. This has resulted in the introduction of a regime due to which fields were irrigated for two hours every four days. This provided the plants with their water needs and saved energy and manpower at the same time.

5- The On-Farm Demonstration Program (OFDP) allowed the participation of seven farmers in the project experimentations. The OFDP introduced suitable packages of farming practices that led to considerable increases in crop yields. (This point will be discussed later in more details).

6- Results of the DFSP as well as the whole experience of the DDC were disseminated in presentations contributed to several conferences, seminars and workshops in, and outside Egypt.

7- The research team, coming from different institutes and research centres of the country, has accumulated a wealth of experience on desert farming. This would contribute to the development and improvement of agricultural practices in the reclaimed desert lands.

3-Context / Environment

1- Institutional Environment

It is difficult to deal with DFSP- Phase III in isolation from its two previous phases; equally true, the DFSP cannot be separated from the DDC itself as hosting institution. Meanwhile, the IDRC support to the three phases of the project was among the earliest financial inputs received by the DDC at the time of its inception. Therefore, it can be said that the IDRC fund did not only support the implementation of a

long-term multi-phases research project, it has also contributed to the establishment of a unique and outstanding research institute in Egypt.

The DDC has developed since 1979 from a Desert Development Project having 40 feddans to a Desert Development Centre with two farm stations of a total area of about 450 feddans now.

In my two visits to the DDC, I found the working environment there as very convenient, thanks to a dynamic director with pleasant personality, and an enthusiastic research team of different disciplines, most of them are young scientists.

Moreover, in my interview with Dr. Adli Bishay, the founder and the first director of DDC , and the PI of the DFSP, he seemed to me as a man of vision. He was talking about the DDC and the project with love and affection. In my opinion, Dr. Adli Bishay leadership of the DFSP and DDC has played a great role in the attraction of funding agencies and the expansion of this institute.

However, although the DDC is affiliated to the AUC, it is completely dependent upon funds it can raise from different donors. This makes the DDC adminstratively and financialy fragile, and causes discountinuity of the research team, who are all part-timers except the DDC director who has a full-time contract with AUC.

Moreover, this situation does not allow good accumulation of experience. An example of this is the DIEP which is currently supported by the IDRC. The researchers involved in this project seem to doing well. But they did not know about the results of the irrigation experiments carried out in the DFSP. It was a new research team, and they did not see the documents of DFSP.

2-External Environment

The rapidly changing economic environment in Egypt, especially in the field of agriculture, had heavily affected both the outputs and impact of this project.

In their design and evaluation of the agricultural package, the project researchers depended upon the fact that chemical fertilisers were heavily subsidised by the state. Therefore, they made their calculations of the inputs' costs as fertilisers prices did not constitute a significant part of the costs. Now, such a package is no longer valid from the economic point of view. This is actually a serious shortcoming reflecting the isolation of research efforts from the socio-economic and political environment under which the research activities were carried out. Was the project able to anticipate the dramatic changes in the agricultural policy of the Government of Egypt? And could the project redesign itself to adopt? These are actually very relevant questions. However, it was not the problem of the DFSP only, rather it was a question related to the decision-making mechanisms at the national level and their share of participation.

During the several meeting of the evaluation team in IDRC office in Cairo there was a question which was repeatedly raised: Do we evaluate the projects (their designs and findings) or their impact? Of course the outputs of any project cannot be separated from the concepts and designs upon which the project was based. In my opinion, a crop management package tailored for a virgin desert area should have been dependent on the maximisation of internal inputs (organic fertilisation and non-chemical pest control methods) rather than the heavy dependency on external inputs. This is not only for the sake of economic reasons, but also for the protection of the environment of an already fragile ecosystem which has limited carrying capacity and biodiversity.

Moreover, when I asked the DDC farm manager, the only person who participated in the DFSP and still works in the DDC, to visit the seven farmers whose farms have been used in the OFDP, he told me that all of them have quitted field crop cultivation and transformed their lands to horticulture. In my interview with Mr. Adel Ghieta, one of the farmers who have participated in the program, he said that he and his neighbours have taken this decision because of many reasons:

- water and electricity supplies are unreliable in the area, and field crops are very sensitive to water shortage;

- marketing was done in the past through the co-operative which is no longer existent. Farmers now have to deal individually with the wholesalers who dictate the farm-gate prices of rapidly perishing goods;

- manpower is rare in the area, and the middleman (*el-mekawel*) has the control over both the supply and the wage of farm workers.

This is an example of how the " external environment " can compromise the impact of a good research work.

Moreover, the absence of agricultural extension services in the area have added an extra burden on shoulders of the researchers in DDC.

4- Reach

According to the project proposal, the immediate beneficiaries of phase III would be " the 600 graduate farmers and the 1000 settlers owning reclaimed land ".

- Although there are no records of the numbers and types of beneficiaries the project have reached upon, it is evident that results, innovations, and packages produced by the DDC staff are highly

appreciated by farmers in the surroundings. In the absence of formal extension services, the DDC is the only resort for them. DDC research staff did the extension workers' jobs. They helped the farmers in the identification of problems they faced, they gave them advises and consultations about different practical cropping aspects. In words spelled by farmers in the surrounding farms, " the DDC people are the only ones who used to care about us ".

The DDC nurseries and tissue culture units are now faced by high demands for their production of authenticated seedlings and varieties.

The training centre has organised 15 training sessions, from November 1994 to May 1997. The total numbers of trainees reached 1274, most of them are graduates who benefited from the national program to allocate new-reclaimed lands to young graduates.

5- IMPACT

5.1. Impact of IDRC Support

• As mentioned before, the IDRC fund was one of the earliest financial supports given to the DDC (according to Dr. Adli Bishay it was actually the second fund following a fund offered by NEF). At that time, in the early 1980s the DDC had only 40 feddans. Now the total land area of DDC farms is 450 feddans in two stations (Sadat City and South Tahrir) in addition to the DDC office in Cairo.

• Most of the research results obtained throughout this project , in its three phases, have furnished the basis for other research and development projects at DDC. Examples are the Model farms (sponsored by the MAXI project), Horticulture / Fodder / sheep model farm (sponsored by NEF), and Fodder / Animal Research project (sponsored by NARP).

• A good example on the impact of the IDRC support on the development of the DDC is what Dr. Adli Bishay told me: "when the agricultural counsellor of the US Embassy in Cairo visited the project site, he was fascinated by the efforts made by the DDC people under severe desert conditions. The man asked how these ideas can be disseminated to wider circles of people ? Dr. Adli Bishay's answer was " a training centre "! Later on, a fund of LE 14 millions was transferred by the USAID to the MOA, by which the training centre was established. Now the training centre includes a conference hall of 150 people capacity, a men hostel, a women hostel, and a dining hall. (see photographs, Annex 5).

5.2. The Training Centre

During the period from November 1994 to May 1997, fifteen training sessions were organised in the training centre in South Tahrir Station. The 15 sessions were attended by 1274 trainees. Data available up to session 13 indicated that 1027 trainees participated in the trainings. They were graduates in different disciplines as follows:

259	Agriculture
99	Engineering
45	Science
260	Commerce
364	Social and Human Sciences
1027	Total

In addition, there were also training courses on desert agriculture organised in the AUC in Cairo by DDC staff. Unfortunately, there are no available data on the number of these courses and the number of participants.

However, out of 1274 trainees there were only 25 girls! (less than 2 % !!). When I raised this point of gender bias with Mr. Nabil Helmi, the Training Program Officer, he said that it is the MOA which sends the trainees to the DDC, and this ratio reflects the percentage of girls among the beneficiaries of the national project to allocate new lands on young graduates. Some of these " young graduates " have been graduated more than 10 years ago!

Again, the impact of the training courses might be compromised because of several intrinsic and extrinsic factors:

• The training program was run through an agreement between the DDC and MOA. The program was concluded in May 1997. When I met with the program officer in Cairo, it was his last day with the DDC. He did not know if there are another training programs in the seen future.

• There was no deliberate effort to link the training contents with the results of activities carried out through the DDC projects. It is true that the participants use the DDC projects' facilities, but the trainers are not in close contact with the project findings. The DDC produced a series of 6 training manuals (see the list in Annex 2). Names of the authors do not reflect the presence of the researchers running the research projects there.

• There is no planned follow-up for the trainees after finishing their training courses. Some of them may come back by their own to ask the DDC staff about some advices.

• In an interview with Dr. M.H.Nawar, a rural sociologist, he told me that attending the training course is a condition for the graduate to get his / her allocated land parcel. Thus, the graduate attends the course without previous practical experience in desert farming . Training needs assessment has been never carried out. A recent questionnaire made on a

sample of 131 graduates revealed that not more than 25% of the respondents stayed in the land after being allocated. Most of the trainees got their lands more than two years after attending the training course. However, it seems that DDC has become aware of the importance of incorporating socio-economic and extension aspects in its on-going programmes.

3- Impact on NGOs

• During my second visit to the DDC, there were small groups of NGOs members participating in specific training programmes on apiculture, sericulture, and dairy production. This hopefully may be a new rout for

the dissemination of DDC impact among wider circles of those who are interested in community development in arid and marginalized areas.

• Although he is retired now, Dr. Adli Bishay, the ex-director of the DDC and PI of the DFSP, is currently heading a NGO called FEDA (Friends of Environment and Development Association). FEDA is establishing a new desert farm in Wadi el Natron (at the middle of Cairo - Alex. desert Road) where they apply techniques, lessons and experiences gained throughout the years of DFSPs. FEDA members are researchers worked in the DDC projects and students trained in the DDC courses.

4- Impact on Farmers

• In spite of the fact that all farmers worked with DFSP have quitted field crop cultivation and transformed their lands into horticulture, I was keen to know the direct impact of the project on them at the time of project implementation. In my interview with engineers Adel Ghieta and Shawki Abdel Kader they reported:

a- " The DDC people were the first and the only ones who knocked our doors and offered their help."

b- Thanks to the DFSP staff we succeeded to solve the problems of plant parasitic nematodes, our soil now is far less infested by nematodes than before " (because the old way for desert cultivation followed in el Tahrir depended upon the transfer of huge amounts of silty soil from the delta and valley to be spreaded on the surface of sandy soil; the transferred soil was brought with its chronic problems, i.e. weeds, nematodes and other soil-born diseases).

c- "Equally true, farmers are now more able to mange the weed problems through different practices extended to us by the project people."

d- " During the implementation of the OFDP the yield of groundnuts increased form 3 ardab / F to 24 aradab / F. That was because of the application of inputs package suggested by the project. "

• According to the project results, Alfalfa proved to be the best fodder crop in the desert. Now alfalfa is grown successfully in the DDC farm. Five cuts / season can be harvested. Animals reared in the farm (mainly 500 heads of Barki sheep) depend entirely on alfalfa production. Alfalfa is now cultivated in many other desert areas in Egypt.

• In addition to farming practices, the DDC attempted to introduce biogas, solar energy and types of desert architecture. Yet, the two types of houses built in the DDC farm are still not applicable. The same goes with both biogas and solar heaters, dryers and cookers. It seems that this area needs more research at the technical and socio-economic levels. Farmers in the area are still building their houses using the same way of building in the cities, although they complain that these houses are very hot in summer and very cold in winter.

5- Impact on the Environment

• Although farming techniques followed now in the DDC and suggested by its staff to the neighbouring farmers cannot be described as organic agriculture, they tend to use the minimum amount of pesticides and rational amounts of fertilisers. The main principle here is the use of varieties that best suit desert environment and the adoption of a combination of cultural practices that can provide favourable conditions for crop growth. This approach is environmentally correct and economically sound.

6- Enhancement of Outcomes

The outcomes and impact of DFSP as well as other related activities of the DDC would have been enhanced and maximised if more considerations were given to administrative and socio-economic aspects.

1- As IDRC is one of the major funders of the DDC, it is requested to ensure availability, accessibility and utilisation of its previous supported activities when new joint work is planned.

2- The long term impact of the DDC research work, which is of great value in itself, would have been more effective if the AUC reconsidered the way by which the DDC is run. The excessive dependency on soft money coming from external sources does not allow the presence of permanent personnel enough to ensure continuity and sustainability.

3- The DDC would have had greater impact on wider circles if it was more opened to the various approaches of desert agriculture in Egypt and other Arab countries, especially in the field of organic agriculture and low - external input and sustainable agriculture in arid and semi-arid zones

4- Although the commercial production of fruit and ornamental seedlings in the DDC plastic nurseries represents a good step to self reliance, the size relative of this work should be observed. It should not consume the effort and time of young researchers. Development research should be the main objective.

5- Although there is an emerging tendency among researchers to work in close relation with farmers, the impact of this approach would have been greater if farmers' participation was considered from the stage of experimental design, implementation and evaluation. Information about participatory research approaches should be available. The involvement of sociologists and economists should be ensured throughout the research course.

6- Although there are difficulties facing the new land owners in the desert areas, outcomes of the training sessions organised by DDC would have been increased if there was intended linkage between findings of the DDC research and contents of the training courses, including the training manuals. Meanwhile, needs of farmers should be assessed and the results of such assessment should serve in developing new training courses.

7- Women participation is very weak, almost absent, among research staff. Moreover, no attempts were done to assess the impact of the research activities on women needs, role, responsibilities, and their access to resources, information and technology. The overall developmental impact would have been more fair if gender issues were considered through out the research activities. In this regards, training workshops addressing both researchers and their collaborative farmers can be organised on specific gender topics. Priority may be given to gender sensitisation and the incorporation of gender considerations in policy and planning.

Annex (1)

DESERT FARMING SYSTEMS
PROJECT DOCUMENTS

1- Project Proposal (1986) 20 pp.
2- Project Summary (1986)
3- Project Appraisal (1985), 3 pp.
4- Project Completion Report (1991), 11 pp.
5- Summary of phase I, II, and III, 5 pp.
6- Second Progressive Report (Phase III) (1988), 131 pp.
7- Third and Final Progressive Report (1989), 110 pp.

Annex (2)
DDC PUPLICATIONS

I. A list of DDC Training Manuals (In Arabic)

1- Soil , Water, Fertilisation of Desert Reclaimed Land . (1996). 276 pp.

2- Field Crop Production in the Newly Reclaimed and Desert Lands. (1996). 252 pp.

3- Fund- Generating Productive Micro-Enterprises in the New Lands. (1996). 277 pp.

4- Animal and Poultry Production in Desert Areas. (1996). 294 pp.

5- Agricultural Pests of New and Desert Lands: Identification and Control Techniques. (1996).406 pp.

6- Economics and Management of Desert Farms. (1997).

II. BROCHURES

1- DDC / AUC / Sadat Research Station. (In Arabic).

Annex (3)

Visits to project sites

1- A visit to the DDC, Sadat Station, Thursday, May 15th 1997.
2- A visit to the DDC / South Tahrir Station, Thursday, May 15th, 1997.
3- A visit to DDC / South Tahrir Station, Wednesday, May 21st.
4- A visit to El-Nagah Village, El Tahaddi Sector, South of Tahrir, Adel Ghieta Farm, Wednesday, May 21st .

Annex (4)

INTERVIEWS AND MEETINGS

1- Meetings with Dr. Mohamad Sabbah, Director of DDC, on Thursday, May 15th, 1997. DDC Sadat Station; and on Sunday, May 18th, 1997, DDC office, Zamalek, Cairo.

2- Interviews with scientists and researchers in DDC Sadat and S. Tahrir Stations on Thursday, May 15th and Wednesday, May 21st, 1997.

Dr. Samir Ismael	Irrigation Engineering, Alex. Univ.
Dr. Maher Ibrahim	Pesticides, Alexandria University
Dr. M. Turky	Horticulture (Tissue Culture) Alex. Univ.
Dr. Said Mahmoud	Animal production, Kafr El Chiekh Univ.

3- Interviews with Mr. Nabil Helmi, Training Program Officer, on May 15th, 1997 in S. Tahrir Station, and on Sunday, May 18 th, 1997 in DDC office, Zamalek, Cairo.

4- Interview with Dr. M. H. Nawar, Rural Sociologist, on Sunday, May 18th, 1997 in Zamalek, Cairo.

5- Interview with Dr. Adly Bishay, Principal Investigator of the DFS project, on Monday, May 19th, 1997 in FEDA / SDP office, Kasr El Eini, Cairo.

6- Interviews with Mr. Said Khattab and Mr. Monir Mosaad, two agricultural engineers working in DDC, S. Tahrir Station farm, Thursday, May 15th, 1997.

7- Interview with Mr. Chawki Abdel Kader, DDC farm manager and Mr. Adel Ghieta, an owner of 30 F. farm in El-Nagah Village, El Tahaddi Sector, S. Tahrir, Wednesday, May 21st, 1997.

8- Telephone conversation with Dr. Saif Attallah Saif, Agronomist, Faculty of Agriculture, Moshtohor, who was involved in the crop rotation design in the DFSP. Monday, May 19 th 1997, Cairo.

9- Meeting with Dr. Fawzy Kishk, IDRC, Cairo. May 25 th 1997.

Annex (5)

Photographs

Graduates Training Centre, DDC South Tahrir Station.
Note the architecture of the building which suits the desert climate

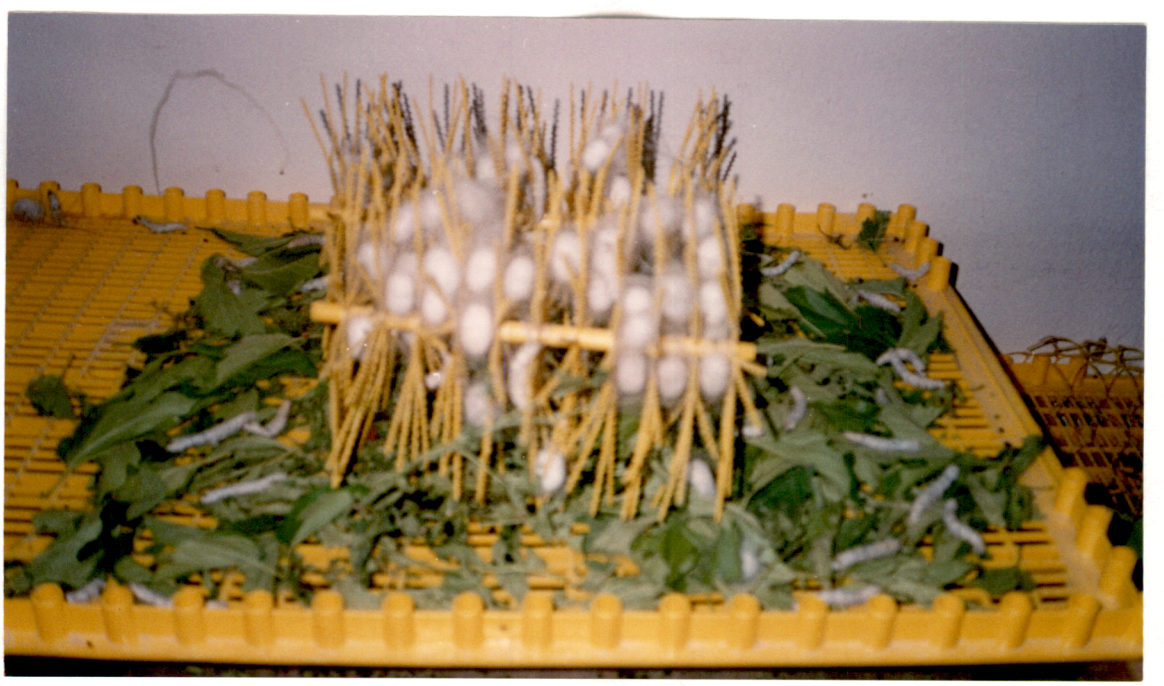
A group of trainees attending a lecture on chemical properties of bee honey in the GTC Conference Hall.

The GTC Conference Hall is able to host 150 people. The Hall is equipped with audio-visual facilities

The kitchen and dining room attached to the trainees' hostel

A general view of the trainees hostel in South of Tahrir Station. The accommodation facilities can host 150 trainees

The administration building in the DDC Tahrir Station



Demonstration of improved techniques for the rearing of silkworms and silk production. DDC / South Tahrir Station

Annex (6)

ACRONYMS AND ABBREVIATIONS

AUC	American University in Cairo
DDC	Desert Development Centre
DFS	Desert Farming Systems
DFSP	Desert Farming Systems Project
DIEP	Desert Irrigation Efficiency Project
FEDA	Friends of Environment and Development Association
FF	Ford Foundation
GTP	Graduates Training Programme
IDRC	International Development Research Centre
MAXI	University Linkage Project
MOA	Ministry of Agriculture
NEF	Near East Foundation
NGOs	Non-Governmental Organisations
OFDP	On-Farm Demonstration Programme
PI	Principal Investigator
SDP	Sustainable Development Programme
UNDP	United Nations Development Programme

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Annex (7)
Summary Table

Potential Beneficiary / User	How Benefit	Extent actually benefited/ affected	Factors helping(+) or hindering (-) Impact	Potential for future benefit
1-DDC/AUC	-establishing infrastructure - equipment and research facilities -DDC is now able to make several analyses and produce quality seedlings to the farmers	IDRC support to DDC through 3 successive phases of DFSPs was considered a major support given to the center over more than 10 years	(+) the recipient enjoys good reputation as a research institute of unique nature (–) DDC is administratively and financially vulnerable to shocks, because its complete dependency on grant funds	- the recipient is able to raise funds from different donors -DDC is now able to organise training courses on desert farming at national level - DDC can develop its capabilities to be a regional research and training center on agriculture in arid areas
2- Researchers working in the project	- capacity building - accumulated experience in the field of desert farming	challenges of working in hostile desert environment acquired the project staff valuable experience	(+) competent researchers in different agri-disciplines (–) all project staff are part-timers. They have to leave back to their original institutes after the project terminated	low. Accumulation of experience is not realized. But individual researchers can raise funds for their institutions to conduct research programs in related areas
3- Farmers in the newly-reclaimed desert areas	-supplying farming package suitable to desert conditions resulted in higher yield and better quality crops	farmers became able to solve several problems related to soil, crop rotation, irrigation, and fertilization - information made available through simple publications and direct contact with project staff	(+) farmers appreciate efforts done by DDC staff (+) good results encourage more farmers to apply the research findings (–) no systematic extension services (–) external factors compromise the benefits gained from research findings	-limited, because of lack of sustainable channel via which information flow can continue - benefits are reduced to only purchasing good seedlings and tissue-cultured HYVs

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4- Graduates, beneficiaries of national project of land distribution	- information on desert farming, small enterprises,..etc.	attending training courses organised by the DDC	(+) DDC is the " good neighbour" (–) time lag between the training and receiving the land (–) difficulties facing the young new farmers are frustrating	-Low. No needs assessment is carried out so far. -no clear mechanism to sustain the training courses
5- NGOs concerned with environment and development NGOs	more information available on desert agriculture	the concept of desert farming based on environmetnally sound practices is adopted by a few- but steadily increasing NGOs in Egypt	(+) close relations between some project personnel and NGOs activits (–) training offered by DDC to NGOs is still costly, beyond the financial capacity of many NGOs	- some NGOs have already started desert farming projects, certain donors are interested in supporting such initiatives
6- Crop production professionals and decision-makers	- data on crop pattern suitable to desert conditions, as well as crop rotation, irrigation, tillage, fertilization and pest control	these data would help in making strategies and plans for desert cultivation	(+) good relations between specialists and DDC staff (+) agreement of cooperation between DDC and MOA existed (–) no long-term programs on desert research for development exist so far	findings can be used in the big national desert reclamation projects (Tushka is and example)